Patent Claims

1. Method for the optical examination and/or processing of a sample, wherein a short-pulse illumination light is generated, the illumination light is split spectrally for generating spatially separated spectral components with pulse lengths that are greater than the pulse length of the illumination light source, the spectral components traverse transmission optics in direction of the sample, the illumination light is focused on or in the sample, wherein the spectral components are superposed, and the sample light is detected.

2. Method according to claim 1, wherein the spatially separated spectral components are changed into a parallel beam bundle.

3. Method according to claim 1 or 2, wherein the pulse length of the spectral components focused on or in the sample is smaller than the pulse length of the spatially separated spectral components.

4. Arrangement for the optical examination and/or processing of a sample, comprising means for generating an illumination light, means arranged downstream of the latter for spectral splitting of the illumination light for generating spatially separated spectral components, means for parallelizing the split illumination light, means for focusing the illumination light on or in the sample, wherein the spectral components are superposed, and means for detecting the sample light.

5. Arrangement for the optical examination and/or processing of a sample, comprising means for generating a short-pulse illumination light, means arranged downstream of the latter for spectral splitting of the illumination light for generating spatially separated spectral components with pulse lengths that are greater than the pulse length of the illumination light, transmission optics for transmitting the spectral components in direction of the sample, means for focusing the illumination light on or in the sample, wherein the spectral components are superposed, and means for detecting the sample light.

6. Arrangement according to at least one of the preceding claims, wherein means are provided for changing the spatially separated spectral components into a parallel beam bundle.

7. Arrangement according to at least one of the preceding claims, wherein the pulse length of the spectral components that are focused on or in the sample is smaller than the pulse length of the spatially separated spectral components.

8. Arrangement according to at least one of the preceding claims, wherein dispersion means which are preferably adjustable are provided between the light source and the means for spectral splitting.

9. Arrangement according to at least one of the preceding claims, wherein the parallel beam bundle is coupled into and out of a glass fiber bundle.

10. Arrangement according to at least one of the preceding claims, wherein the spectral splitting is carried out by means of at least one prism and/or axicon and/or transmission grating and/or reflection grating.

11. Arrangement according to at least one of the preceding claims, wherein the change into a parallel beam bundle is carried out by means of another prism or another axicon or another grating.

12. Arrangement according to claim 11, wherein a first prism and a second prism or first axicon and second axicon are constructed in such a way that, together, they act like a plane plate.

13. Arrangement according to at least one of the preceding claims, wherein a direct-vision prism is provided for splitting and parallelizing .

14. Arrangement according to at least one of the preceding claims, wherein a compensating element is preferably provided in the parallel beam path for influencing the components.

15. Arrangement according to claim 14, wherein the components are influenced in an adjustable manner by exchangeable optical elements with different cross-sectional shapes and/or by a spatial light modulator (SLM).

16. Use of an arrangement according to at least one of the preceding claims in a fluorescence microscope.

17. Use of an arrangement according to at least one of the preceding claims in a multiphoton microscope.

18. Use of an arrangement according to at least one of the preceding claims in a laser scanning microscope.

19. Use of an arrangement according to at least one of the preceding claims in nonlinear laser scanning microscopy.

20. Use of an arrangement according to at least one of the preceding claims in materials processing.

21. Use of an arrangement according to at least one of the preceding claims in the treatment of biological tissue.

22. Use of an arrangement according to at least one of the preceding claims in the treatment of the cornea of the eye.